How to Conservation ON YOUR OWN

Field Handbook

A supplement to the "how to" videotape that will help you do your own soil conservation

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Conservation on your own

The Soil Conservation Service and the National Association of Conservation Districts have produced a "how to" videotape showing how to do many of the conservation practices in your conservation plan.

This field handbook is a supplement to the video. Although it isn't as detailed as the video, this handbook has helpful guidelines to the practices you're likely to use. Study the video, then take this handbook to the field with you.

For each practice, the "getting started" section will remind you of what you need to do ahead of time and what to take to the field. The other sections outline the steps to follow in implementing the practices and tell you how to maintain the practice or how to work it into your farming system.

If you have any questions, call your local Soil Conservation Service office.

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How to measure and manage residue

Getting started

Knowing how to measure residue is an important tool in soil conservation. The way you manage your residue determines how protected your fields are from soil erosion.

Watch the video "How to measure and manage crop residues." To measure residue, you'll need either a **tape measure**, a **cable**, or a **rope with knots**.

Measuring residue

You can get a rough idea how much residue is in your field by just looking. One way is to look down and estimate how much of the soil is covered by residue in a 3 foot by 3 foot area.

A more accurate, easy way to measure residue is to lay some kind of tape over the field. You can use a 50-foot wire cable with marks every six inches, a 25-foot measuring tape, or even a knotted rope as short as 10 feet.

1. Choose a representative part of the field.
2. Lay the rope, cable, or tape diagonally across the rows. Walk along the rope, cable, or tape and count how many times you find residue under a marked spot.
3. Convert the number of times residue was counted to a percentage. For instance, if you used a cable with 50 marks on it, multiply the number by 2. A 10 foot rope with knots every foot should be multiplied by 10.
4. Take three to five measurements randomly throughout the field and average them for your final residue estimate.

Measure residue after planting. If you aren't satisfied with the amount of residue cover, you'll want to make some changes in your tillage operations next year.

Management

Weather conditions, soil type and speed of tillage have an effect on how much residue you leave on the surface. Driving slower will help keep more residue on the surface. The type of tillage implement used affects residue, and the more you till the more residue is buried.

The table below shows estimates of residue cover remaining after using a tillage and planting system. Multiply the percentages of each operation shown in the table.

Example: Assume a system with three operations: Anhydrous application; disking, tandem and shallow; and planting. The previous crop was corn with 95% cover following harvest.

.95 Initial x .90 Over-winter decomposition = .85 Spring residue cover

.85 Spring residue x .80 Anhydrous application x .70 Disk x .90 Plant = 43% Final residue cover

Percent cover on surface after farm operation

	Corn	Soybeans
After harvest	90-95	80-90
Plow	2-7	0-2
Chisel (twisted shanks)	40-50	10-20
Disk (off-set, deep)	25-40	5-15
Para plow	65-75	35-45
Chisel (straight shanks)	60-75	30-40
Disk (tandem, shallow)	65-75	25-35
Anhydrous applicator	75-85	45-55
Field cultivator	80-90	55-65
Plant	80-90	80-90*
Till-plant	55-65	40-50*
Over winter decomposition	80-90	70-80

**When these are the only operations where soil is disturbed, multiply by .75.*

How to lay out contour lines and use field borders

Getting started

If you've watched the video on how to lay out contour lines and use field borders you're ready to do the job. These guidelines will remind you of the procedures you saw in the video.

Before you go to the field, you should have **flags** for markers and a **hand level** or a **contouring instrument** to put on your tractor or pickup. Of course, don't forget your **helper**.

Laying out the contour line

1. On level ground, look through the hand level and find a spot on your helper that's the same height as your eye level.

2. Go to the nose or saddle of the slope, walk downhill to a point that is slightly above the midpoint of the slope and place a flag in the ground. Have your helper stand by the flag.

3. With your level and flags, walk about 50 feet (17 steps) around the hill. Turn around and sight in the spot on your helper you saw on level ground. Move uphill or downhill until the bubble is centered on the spot on your helper. Put a flag in the ground.

4. Advance another 17 steps. Your helper should move to the flag you just set. Repeat the previous procedure until you reach the field border. *To save flags, your helper could pull every other flag, leaving flags spaced every 100 feet.*

5. Return to your beginning point at the nose of the slope and repeat the procedure in the opposite direction until you reach the other field border.

Checking your work

The line you have made with the flags is the key contour line. Follow the key contour with a pickup or tractor to make sure there are no curves too sharp to maneuver machinery.

If you find a curve too sharp to be farmed, make an adjustment of one or more marker flags. **Remember to check with your SCS office to see what the limits are on how much you can adjust the contour.**

Once you are sure the contour line is satisfactory, mark the line with a plow or disk, and remove flags.

Tools and tips

- Laying out contour lines can go faster if you use two all terrain vehicles, instead of walking.

- A substitute tool for a hand level is a contour gauge. Drive your tractor or pickup to a level spot, and mount the gauge or level on a side window with the bubble centered. Then drive to the field. When you get to the point where you want to begin your contour line, drive slowly around the hill, keeping the ball of the gauge in the center. Have someone walk behind and place flags in the ground every 100 feet.

- Consider planting a narrow strip of grass through your field that establishes a permanent contour line.

Field borders

Field borders should be part of any contour system. They help you avoid planting end rows up and down hill. Make field borders wide enough to turn farm equipment. SCS has recommended grasses and forages, and seeding rates for these areas.

How to lay out contour buffer strips

Getting started

Layout of contour buffer strips includes laying out a contour line, so you'll want to watch the videotape on laying out a contour line before you begin.

You 'll need **flags,** a **hand level** or **contour gauge**, and a **cable** or **rope** as long as the width of your buffer strip. Before you start, you'll need some information from your conservation plan or your soil conservationist:

- percent of the slope that needs to be in grass
- minimum width for grass strips
- maximum crop strip width

Laying out the buffer strips

1. Walk to the high point of your field, then pace or measure down the width of your crop strip.

2. Lay out a contour line with one of the methods shown in the "How to lay out contour lines" videotape.

To keep crop rows parallel with a minimum of point rows:

3a. Find the steepest part of your slope along the contour line, and measure downhill the minimum width of your grass strip. *This will be the lower border of the top grass strip.*

4a. Place a different color flag at that point than your contour line flags, and lay out another contour line. *Unless your slope is uniform, you'll notice the grass strip isn't an even width.*

5a. Extend a tape or cable downhill the width of your crop strip. One person walks along the contour line just established while the other person stretches the cable parallel to that contour line and marks the bottom of the crop strip width with a flag every 50 feet.

6a. Along the line just flagged, *the bottom of the crop strip*, find the steepest area, measure down the minimum width of the grass strip. Lay out and flag another contour line.

7a. Again, stretch the cable along that line, walk parallel to the contour line just established and flag the strip. Continue this process until the entire slope is laid out.

To get even width grass strips which result in more cropland but also more point rows, adjust the procedure.

3b. From your first contour line, *which is the top of your grass strip*, extend a rope or chain downhill the width of your grass strip. Flag a line parallel to the top of the grass strip.

4b. From the bottom of this even-width grass strip, find the steepest part of the slope along the line, measure down the width of your crop strip, and lay out another contour line. *Notice it's now the crop strip that isn't an even width all the way through.*

5b. Cable or rope off another even-width grass strip. As you continue to make even-width grass strips, and to run a contour line at the top of the next grass strip, you set up the pattern of even-width grass strips down your slope.

The conservation system

Contour buffer strips are one part of your conservation system. Field borders and grassed waterways should also be a part of that system.

Another good idea is to lay out the contour system one year and seed buffer strips the next year. With contours already established, you will be able to make layout decisions that make your fields easier to farm. For complex slopes, you may want to get help from SCS.

Points to consider in contour stripcropping

Getting started

If you have contour stripcropping in your plan, you have chosen a practice that combines the soil and moisture savings of contouring with the soil-building and soil saving advantages of legumes in a crop rotation.

The videos "Points to consider in contour stripcropping" and "How to lay out contour lines and use field borders" will help you plan your contour stripcropping system. You may want help with layout to get the most farmable system.

Strips can be established in a field of hay or in a row crop field. Before you lay out strips, take time to plan the crop rotation system you want for the years ahead.

For the key contour line layout, you will need a **hand level**, a **tape**, and **flags** for markers (two different colors.) To establish strips, you'll need a **cable** or **rope** the length of your strip width.

The width of the strips has already been determined by you and your soil conservationist when your conservation plan was written. Check with your SCS office.

Planning the system

1. Sketch out your strips, labeling the crop in each strip year by year for the next five years.
2. Estimate how many acres of each crop you want every year.
3. Make sure your crop rotation allows for alternating row crops with legumes that will build the soil.
4. Be sure herbicide carryover won't be a problem
5. Decide if you want to remove fences to get longer rows.

Laying out the strips

1. Flag a key contour line about two and one-half strip widths down from the highest point of the slope. *Watch the video on laying out contour lines to establish a key contour line.*

2. From the key contour line, have a helper extend the cable or rope above the line to the length that matches your strip width, and place a flag. **Use different colored flags than those in the key contour line.**

3. Walk along the contour line with your helper walking a parallel line, placing flags to mark the upper boundary of the first strip.

4. Repeat the process, having your helper extend the rope or cable below the contour line to flag a second strip.

5. Continue down the slope staking strips. Remember to use different color flags for the top and bottom boundaries of the strips. It will be much easier to plant each strip that way.

On longer or non-uniform slopes, more than one key contour line may need to be established. Ask your local SCS for help, but be sure to stay involved in the planning and layout.

How to control small gullies with grass

Getting started

Watch the video "How to control small gullies with grass." The most important step in controlling small gullies is to know your land. See where water concentrates; it may have begun to form a small gully where it runs off your field. Then seed grass in these areas; the goal is to get water to run over the grass in the center of the grassed areas.

Establishing grass

1. Decide what the size and shape of your grass seeding will be. A grass area that is too narrow or shallow will allow water to cut ditches on the sides of the grass area. Your SCS office can tell you whether major land shaping is needed for a grass waterway or whether you need only minimal ground work and grass seeding.

2. Begin preparing the seedbed slightly above the point the gully begins and end it where water spreads out and no longer cuts a gully.
   As you shape the area keep in mind that you want water to run down the center of the grassed area.

3. Apply and incorporate fertilizer.

4. Be sure the seedbed is firm before you seed. If your footprint is less than a half inch deep, you've got a firm seedbed. You may need to use a roller or cultipacker.

5. Plant grass seed 1/4" to 1/2" deep. The best row direction is across the area; next best is a figure 8. If you broadcast, cover the seed lightly with a harrow.

6. Mulch the area with straw, if possible, to protect the area until a seeding is established.

7. Anchor the mulch using a straight disk. Make only one trip over the mulch.

Farming around the area

- Lift all implements out of the ground before crossing the waterway.
- Bring row crop patterns into the waterway nearly level, or use it as the turn areas. Don't plant end rows along the side of the waterway; they contribute to failure.
- Fertilize periodically as recommended.
- Inspect the area frequently for places needing reseeding and eroding areas. Repair any problems.
- Maintain the width of the grass area when tilling and planting surrounding fields.
- Don't let herbicide spray continue into the grass.
- Don't use the waterway as a road. Vehicle tire tracks can lead to the formation of a gully.
- Don't mow the grass until a good sod is established. Once it is, the waterway should be mowed. To maximize wildlife nesting benefits, delay mowing until July 15.

How to plant and maintain a field windbreak

Getting started

Consult a soil conservationist about planting a windbreak, and watch the video entitled "How to plant and maintain a field windbreak."

Before you plant your windbreak, consider this checklist:

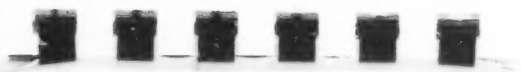
- Decide where the windbreak will be and what tree species and spacing will be used.
- Order trees and shrubs - make sure the delivery date is as close to planting as possible.
- Arrange for watering the trees.
- Arrange to get a tree planter if possible.

The planting site

- Ensure that the planting site is free from weeds. Shallow disking prior to planting will help control weeds.
- Cultivate the site to prepare a smooth planting area.

Planting trees

1. Take the trees or shrubs from storage to the fields.
2. Keep the roots of the trees moist during the planting operation. This is a key element to the survival of seedlings.
3. Use a tree planter and plant your windbreak.



Maintenance of windbreaks

- Replace seedlings that die. Here are some things to remember.
  1. Dig a hole wide and deep enough to allow the roots to be spread out.
  2. Place the tree upright; keep foreign material out of the hole.
  3. Firm the soil around the roots leaving no air pockets.
  4. Fill in around the tree bringing the soil level to the root collar of the seedling and compact it.
- Water trees regularly.
- Keep weeds out of the windbreak area. Herbicide application according to label and cultivation both work well.
- Keep livestock out.
- Consider protecting the seedlings from wildlife damage. Your nursery or hardware store will probably have several products to choose from that will protect your trees.

How to keep your terraces working

Getting started

Terrace maintenance is like buying insurance for your conservation investment. The maintenance practices in this handbook are easy and may save having to do major repair later on.

Watch the video "How to keep your terraces working." Take a close look at your terraces and see if you can troubleshoot any potential problems. **Remember, when terraces need repair or maintenance, do it right away.**

Maintain ridge height and shape

1. Establish conservation measures such as crop rotation and conservation tillage, that help prevent soil erosion between terraces. This helps keep terrace channels from filling with sediment.

2. Never straddle the terrace ridge with tillage equipment. The ends of equipment should operate along the top of the ridge to prevent lowering the ridge height.

3. Always till parallel to terraces.

4. Plow the front slope of broadbase terraces, throwing soil towards the terrace ridge. This helps maintain ridge height.

   - Place the back furrow at the top of the ridge and leave a single dead furrow in the terrace channel. *You also want to throw soil uphill from the backslope or downhill side of the terrace.*

   - To decrease furrow depth at the bottom of the backslope or in the channel, make the last trip with the rear of the plow cutting quite shallow.

   - You can also use a terrace disk to maintain ridge height.

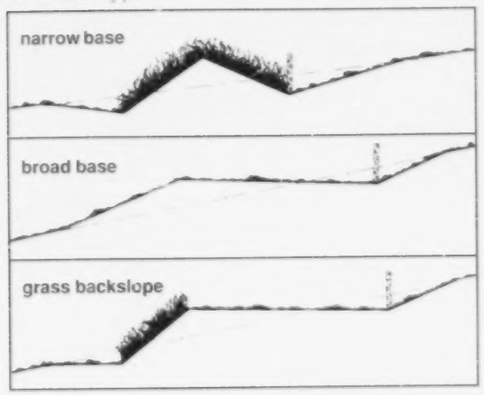
Maintain grass and control pests

1. Fertilize grass if needed
2. Control weed, tree, and brush growth by spraying or mowing.
3. Keep burrowing animals such as woodchucks, coyotes, badgers, and gophers away from your terrace. *Trapping and hunting can usually control these animals.*

Maintain the outlet

1. Check underground outlets, animal guards and tile inlets regularly, especially after a heavy rain. Remove any debris that could slow water flow. Be careful that farming operations don't build ridges or throw soil around the inlet.
2. Protect the inlets from equipment and livestock damage. Use bright paint or flags to mark the inlets.
3. Keep small gullies from forming in waterways used as outlets for graded terraces.

Terrace types



Notes

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